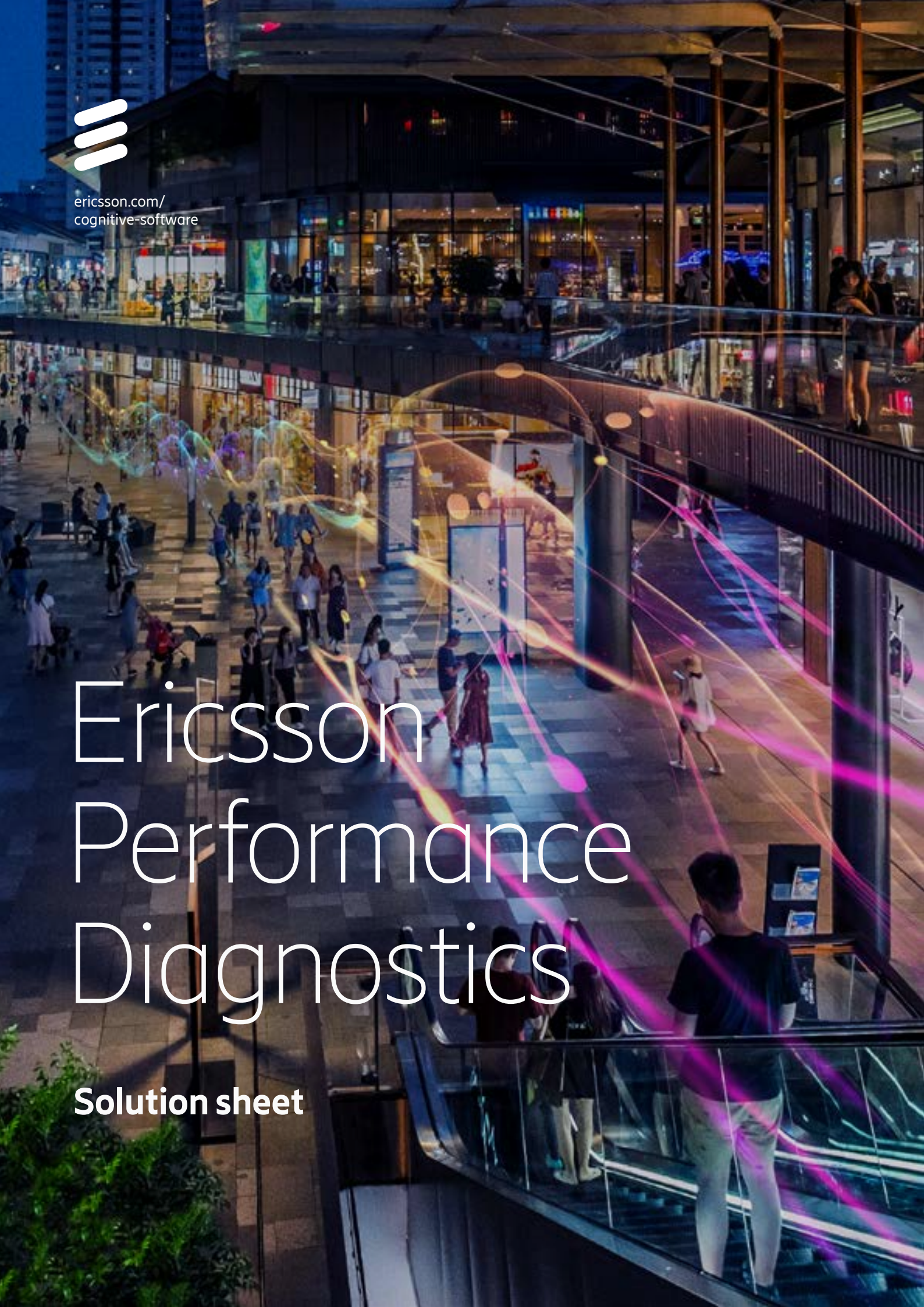

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Ericsson Performance Diagnostics

Solution sheet

Ericsson Performance Diagnostics

AI-based network performance diagnostics analyzes communications service providers' whole Radio Access Network (RAN) to detect and classify cell issues. Identified issues are further investigated down to the root cause level, enabling fast and accurate optimization of end-user performance.

The monitoring and control of network performance is traditionally handled by a team of engineers, who are supported by expert systems that target and optimize limited areas of the network (typically areas with the worst-performing cells). As such, network performance is often optimized by combining manual and automated rule-based instructions with predetermined thresholds for each network performance metric. These rules and thresholds are completely based on human observations and expertise. Furthermore, as the network complexity increases, the number of these rules increases which makes manually maintaining these algorithms a highly complex task.

Ericsson Performance Diagnostics, part of Ericsson Cognitive Software portfolio is a proven AI powered software solution. Over the last few years, it has demonstrated the possibility of creating a fully scalable and automated AI powered solution for network optimization, consisting of automated network data processing, network issue identification and classification, and detailed root cause analysis.

This solution enables a paradigm shift. The issue-centric focus will simplify the process and fix a higher amount of malfunctioning network elements by similar actions, complementing traditional worst cell list and elevating the network performance to a superior level. Reaching an issue granularity level was not possible earlier due to scalability limitations in manual work.

Figure 1 illustrates the high-level architecture of the solution. Firstly, the data is collected by a network management system and undergoes an issue detection and classification screening. After the data processing and transformation is complete, the AI model detects anomaly cells and classifies coverage, handover, or external interference issues, based on over 160 network key performance indicators (KPIs). There are around 50 issue classes currently implemented in the solution. If a new issue type arises in the network, the AI software categorizes it as an "out-of-class" issue, enabling model retraining to be considered and opening the door for additional classes.

The second step is the root cause analysis, where other AI techniques are used to further break down a classified issue to its root cause level. The root cause reasoning enriches the analysis. By integrating network topologies and configurations with hundreds of performance metrics and their two-dimensional correlation in time and space, it is possible to generate a knowledge graph that reveals the specific root causes that lead to an identified network issue. The solution is built on the collection of more than 200 insights revealed by the knowledge graph. Additionally, the contribution model and relation diagnosis techniques generate additional insights about the surrounding cells. The output provides network engineers with actionable insights and enables faster and more effective optimization steps.

The provided key values – scalability, speed, accuracy, and consistency in network optimization – enable service providers to maintain and improve their network performance at a higher level.

Accelerating AI adoption with Cognitive Software

Realizing the value of AI at scale requires overcoming some major barriers. Trust, Flexibility and Agility are among the most challenging, and Cognitive Software can help address these.

Trust

Explainable AI embedded in the applications increases transparency in AI-driven insights and automations.

Flexibility

Tailored AI models and user experience. Globally trained AI algorithms can be locally re-trained when it is convenient to prevent model drifting and adapt better to every network. Application workflows and user interfaces can be customized for seamless operational integration

Agility

Cloud-native architecture that enables highest flexibility for efficient AI-driven operations. Scale up and down as required, and facilitate integration into CI/CD pipelines for in-service software upgrades with 100% uptime

Evolving toward issue-based optimization

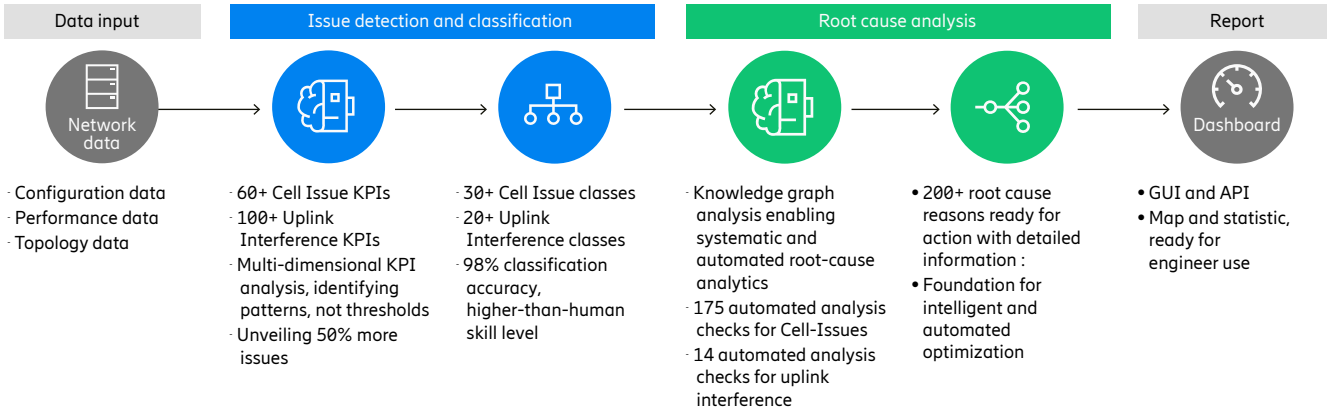
Ericsson's market-proven and AI powered performance diagnostics solution provides a solid foundation for next-gen network optimization.

Ericsson Performance Diagnostics has been deployed by more than 20 service providers on a global basis since its first commercial deployment in 2020. In addition, by leveraging the technology and vendor diagnostic solution design, we have recently been able to add further support for 5G and non-Ericsson RAN vendors. This gives additional benefits for service providers who have multiple RAN vendors in their network as the same solution can handle multiple technologies and RAN vendors.

As technology and application evolve further with 5G uptake, the complexity of network performance optimization is also increasing significantly. As a result, Ericsson's Performance Diagnostics continues to evolve, enabling service providers to transform operations and remain at the forefront of their industries.

Ericsson also has an accompanying application called Performance Optimizers, which takes the output of Performance Diagnostics as input and automatically proposes the parameter optimization. These two applications work together to fully automate network optimization – our final goal.

Figure 1: Performance Diagnostics solution flow



Key benefits

Ericsson's domain expertise embedded
A number of Ericsson's technical experts in the network optimization domain have been working on the most advanced and complex networks. The knowledge gained from those real project experiences is embedded into this solution.

High prediction accuracy
The field verifications have shown an issue detection and prediction accuracy of between 92–98 percent. This means the solution accurately replicates the technical analysis that a senior engineer can perform.

Pre-trained and ready to use
The AI models used in the solution are pre-trained and ready to use as soon as input data is fed into them. The data from various network types were used to develop robust AI prediction models.

Better-than-human capability
When more than one issue co-exists in a cell, it is usually hard for an engineer to identify all the contributing factors simultaneously. However, with AI technology, our solution can. Leveraging a non-supervised learning algorithm, both hidden and new issues can be detected by the system, evolving both the classification and the insights delivered.

Scalability and speed
With impressive scalability and speed, the solution is able to scan the whole network every day. In our largest deployment cases, millions of cells are analyzed daily.

If you'd like to know more, visit https://www.ericsson.com/en/ai/ai-in-networks/cognitive-software

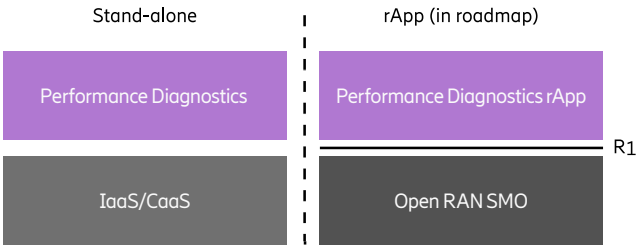
Flexible offering

Every automation journey is different, and every operator needs to align this to other strategic choices in the area of software infrastructure, management platforms, or the overarching technology evolution.

To accommodate this diverse range of scenarios, Ericsson provides Performance Diagnostics as a dual software solution, supporting both standalone deployments and rApps, together with a diverse set of infrastructure options. Ericsson Performance Diagnostics can be deployed in either dedicated hardware, private cloud, public cloud, or Ericsson premises in a software as a service (SaaS) mode.

This flexible offering allows every operator to decide when and how to take steps forward in their transformation at their own pace and with their own priorities.

Flexible deployment models for Ericsson Performance Diagnostics



Ericsson enables communications service providers to capture the full value of connectivity. The company's portfolio spans the following business areas: Networks, Cloud Software and Services, Enterprise Wireless Solutions, Global Communications Platform, and Technologies and New Businesses. It is designed to help our customers go digital, increase efficiency and find new revenue streams. Ericsson's innovation investments have delivered the benefits of mobility and mobile broadband to billions of people globally. Ericsson stock is listed on Nasdaq Stockholm and on Nasdaq New York.

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